20th Congress, 1st Session. [Doc. No. 22.] Ho. of Reps. Navy Dept.

AMERICAN WATER ROTTED HEMP.

LETTER

FROM THE

SECRETARY OF THE NAVY,

TRANSMITTING THE

Information required by a resolution of the House of Representatives, of 2d March, 1827,

IN RELATION TO EXPERIMENTS ON

AMERICAN WATER ROTTED HEMP.

DECEMBER 24, 1827.

Referred to the Committee on Manufactures.

WASHINGTON:

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1827.

NAVY DEPARTMENT,
20th December, 1827.

SIR: In answer to a resolution of the House of Representatives, o the 2d March, 1827, directing the Secretary of the Navy to report "the result of any experiments which have already been made, or are now making, in the Navy of the United States, to ascertain the quality of American water rotted hemp, compared with Russia hemp," the Secretary of the Navy has the honor to enclose a copy of a letter from the Commissioners of the Navy, on the subject. Reference is also respectfully made to a report from this Department to the Senate, on the same subject, dated 5th January, 1825.

The small quantity of water rotted hemp which has been heretofore prepared, has not afforded very extensive opportunities for making experiments upon it; but such as have been made are entirely satisfactory, and importations of hemp will not be necessary when sufficient quantities to answer the demands of the service shall be produced in the country. Cordage of American water rotted hemp would always be preferred, when found of equal quality.

It is perhaps proper to observe, that there is no establishment connected with the Navy in which hemp is manufactured, and, therefore, it is not purchased in its raw state by the Department. It will, however, be the interest and policy of the Government to make such establishment whenever it is believed that economy will be promoted by it.

Respectfully submitted.
SAM'L L. SOUTHARD.

The SPEAKER
Of the House of Representatives.

NAVY COMMISSIONERS' OFFICE,

17th December, 1827.

SIR: The Commissioners of the Navy duly received your letter enclosing a resolution of the House of Representatives, of the 2d of March last, requiring a report of the result of any experiments to ascertain the quality of American water rotted hemp compared with Russia hemp; and, in reply, they have the honor to state, that all the experiments heretofore made of these different descriptions of hemp, have uniformly tended to establish the opinion, that the American hemp loses nothing in the comparison, whether we refer to its strength or its durability, when made up into cordage.

Experiments have been made of these hemps in their hatchelled state, before they were spun into yarns; and, in that state, the American hemp was found to be the strongest; and, after being made up into cordage and tested on board of a ship under the command of one of the present Commissioners, its strength and durability were ascertained to be fully equal to cordage made of the best Russia hemp similarly exposed. If there be a difference between the best American and the best Russia water rotted hemp, when brought to our market, the Commissioners would unhesitatingly say it is in favor of the former. Admitting their staples, in their original state, to be equally good, the Russia hemp is certainly liable to greater injury from transportation; and that it does sustain more or less injury in its transportation from Russia to our ports, is believed to be an unquestionable fact.

At the instance of a gentleman from Pennsylvania, the Commissioners, in the year 1824, agreed to purchase two tons of American water rotted hemp, with a view of having it made into cordage of various sizes, and tested on board of one of our national ships with the best Russia: under this agreement between 7 and 8 cwt. only was delivered. This hemp was pronounced by competent judges to be fully equal to the best Russia then in market, and the growers were accordingly paid the full price of the latter for it. It was then made into cordage and sent to Norfolk, to be used in the equipment of one of our national ships; but before it arrived the ship had sailed. A subsequent order was given to use it in reeving the main and main-top, fore and fore-top sail braces of a ship on one side; the other side of the ship to be fitted with cordage made of the best Russia hemp; and the experiment is now in progress: of the result no doubt is entertained by the Commissioners.

The Commissioners are sensible that, in the preceding remarks, they are only reiterating the opinion heretofore frequently expressed

by them. They have never entertained a doubt of American *water* rotted hemp being equal to Russia, but the great difficulty has been to procure a sufficient quantity of American *water* rotted hemp to answer the demands of the Navy. The habit of dew rotting has become so fixed, that it is apprehended a considerable time will elapse before the American community can be persuaded to change it, and resort to the preferable system of water rotting; indeed, a disposition has been manifested to experiment upon new theories, rather than adopt the system successfully practised and confirmed in other countries by long experience. Accordingly, we find that attempts have been made to prepare the hemp, by suffering it to remain twelve months in stack, and then exposing it to the action of dews; by breaking it with a machine in its natural state, without any previous rotting; by subjecting it to the operation of pyroligneous acid, after being dew rotted.

The Commissioners have, from time to time, received hemp prepared in these various modes, and have directed experiments to be made of it. The results of such experiments, although not called for by the resolution, will not, it is presumed, be unacceptable, since their tendency is to establish the opinion entertained as to the properties of American hemp in its original state.

Cordage made of American hemp, stacked one year, and then dew rotted, was fitted on one side of the Frigate Constellation as main, main-top, and fore-top sail braces, main-clue garnets, davits, and stern boat falls. The other side of the ship, in corresponding situations, was fitted with cordage of Russia hemp; and, after being thus worn for nearly a year, it was found, on examination, that the Russia rope, in every instance, after being much worn, looked better, and wore more equally and evenly than the American; that the yarns of the former were rather stronger, and the number of broken yarns not so great as in the American. But, although it thus appeared that the Russia rope was rather preferable, both as to strength and durability, yet, in the opinion of the commander, "the difference between them was not so great as to warrant a declaration that the proof was conclusive in favor of the Russia;" and he recommended further experiments as necessary to decide the question.

Of the same cordage, after being worn nearly two years on board the Constellation, her commander observes, "I have given a fair trial to the Kentucky hemp for rigging. If there is any preference, I would give it in favor of the Russia; thus making it almost a matter of doubt whether cordage made of American hemp, stacked one year, and then exposed to dews, was not equal to cordage made of Russia hemp, when used as *rigging*.

In the year 1825, an experiment was made as to the relative strength of twelve yarns taken from a piece of cordage of Russia hemp, and the same number of yarns taken from cordage made of hemp broke by a machine, without having been either water or dew rotted, and the following was the result:

Russia.		*American.*	
No. 1	sustained 97 lbs.	No. 1	sustained 97 lbs.
2	97	2	140
3	83	3	90
4	140	4	123
5	112	5	133
6	119	6	119
7	147	7	175
8	123	8	147
9	126½	9	147
10	137	10	161
11	119	11	175
12	178	12	179
	1,478½		1,686

Thus, the average weight sustained by the American yarns was 140, while that of the Russia yarns was only 123; proving, incontestibly, that the American was superior in point of strength, when newly made.

The same pieces of cordage (10 inch) were then directed to be immersed in water and mud, with a view to test their relative durability in that exposed state. After remaining thus immersed for nearly twelve months, they were taken up, examined, and tried; and the following was the result:

16¾ fathoms of the American rope were stretched until the outer yarns began to give way; remaining two and a half hours in that state, the purchase was increased until it parted, having stretched 3 fathoms 5½ feet, lost ⅜ of an inch in circumference, and sustained 5 tons, 3 qrs. and 6 lbs.

The same length of the Russia rope similarly tested, stretched 3 fathoms 3½ feet, lost in circumference ⅝ of an inch, and sustained 6 tons, 2 qrs. 12 lbs.

After these tests, the two remaining pieces of equal lengths were bent together, and hove until the American parted, sustaining 6 tons, 2 qrs. 4 lbs.

Two pieces of 12 inch cordage, hawser laid, one made of dew rotted American hemp, prepared with pyroligneous acid, the other made of American hemp, broke by a machine, without any process of rotting, were tested on board the North Carolina, on her late cruise to the Mediterranean. They were found, *when new*, to be as strong or stronger than cordage made of Russia hemp usually is; but, after a lapse of eighteen months, they were found to have lost their strength in an extraordinary degree. Their appearance *then* indicated soundness; but, on unlaying the rope and drawing the yarns, it was found, after trying 20 yarns of each separately, that those of the dew rotted hemp, prepared with pyroligneous acid, suspended, upon an average, only sixteen pounds, while those of the unrotted hemp sustained only eighteen pounds, although, when new, the yarns of either would have suspended at least 125 lbs.

From these facts the conclusion appears irresistible, that American hemp requires only the same process of preparation practised in Russia, to render American cordage fully as good for every species of service as cordage made of Russia hemp. For the process practised in Russia, in the preparation of their hemp for market, the Commissioners would respectfully refer to the report which they had the honor to make on the 17th November, 1824.

I have the honor to be,
With great respect, sir,
Your obedient servant,

JOHN RODGERS.

Hon. SAM'L L. SOUTHARD,
Secretary of the Navy.